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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,072	08/23/2006	Markus Christoph	11336.1238 (P03036US)	3659
757 BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			EXAMINER PAUL, DISLER	
			ART UNIT 2615	PAPER NUMBER
			MAIL DATE 07/02/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/563,072	CHRISTOPH, MARKUS	
	<b>Examiner</b>	<b>Art Unit</b>	
	DISLER PAUL	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/29/05</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

### **DETAILED ACTION**

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 4-6, 9, 17-23, 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated over Feng et al. (US 7,076,072 B2).

Re claim 1, Feng et al. disclose of the handsfree system for use in a vehicle comprising a microphone array with at least two microphones and a signal processing means where the signal processing means comprises a superdirective beamformer with fixed superdirective filters; wherein the superdirective beamformer is a regularized superdirective beamformer using a finite parameter that is frequency dependent (col.4 line 30-65; col.11 line 35 & col.12 line 10; col.17 line 1-5/frequency dependent finite regularize parameter).

Re claim 4. Handsfree system according to claim 1 where each superdirective filter results from an iterative design based on a predetermined maximum susceptibility (col.4 line 30-65; col.11 line 35 & col.12 line 10; col.17 line 1-5/array beamwidth range from min to max with sound impinge on the array with axis AZ).

Re claim 5, the Handsfree system according to claim 1 where each superdirective filter comprises a filter in the time domain (col.8 line 25-30).

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Re claim 6, the Handsfree system according to claim 1 where the signal processing means further comprises at least one inverse filter for adjusting a microphone transfer function (fig.7; col.8 line 25-30).

Re claim 9, the Handsfree system according to claim 6, where each inverse filter is combined with a superdirective filter of the beamformer (col.8 line 25-30; col.11 line 5-16/weight of each filter to inverse).

Re claim 19, the Handsfree system according to claim 1 where at least one microphone comprises a directional microphone (col.2 line 33-36; col.3 line 60-65).

Re claim 20, the Handsfree system according to claim 19 where the directional microphone comprises a directional microphone with a cardioid characteristic (col.14 line 1-5).

Re claim 21, the Handsfree system according to claim 20 where the directional microphone comprises a differential microphone (col.14 line 1-5).

Re claim 17, the Handsfree system according to claim 1, comprising a frame where each microphone of the microphone array is arranged in a predetermined, position in or on the frame (fig.1,8).

Re claim 18, the Handsfree system according to claim 17 where the predetermined position comprises a fixed position in or on the frame (see claim 18 rejection).

Re claim 22, the Handsfree system according to claim 1 comprising a vehicle coupled to the microphone and the beamformer (col.10 line 25-30).

Re claim 23, the Handsfree system for use in a vehicle comprising: a microphone array with at least two microphones and a superdirective beamformer having fixed superdirective filters; where the superdirective beamformers are configured with a predetermined susceptibility that is based on a relative error of the microphone array(col.4 line 30-65; col.11 line 35 & col.12 line 10; col.17 line 1-5/array beamwidth with sound impinge on the array with axis AZ).

Re claims 27-29 have been analyzed and rejected with respect to claims 19-21.

2. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feng et al. (US 7,076,072 B2) and further in view of Abel (US 5,659,619).

Re claim 7, the Handsfree system according to claim 6 with the inverse filter, But, Feng et al. fail to disclose of the at least one inverse filter comprises a warped inverse filter. But, Abel disclose of a system with frequency response wherein the at least one inverse filter comprises a warped inverse filter (fig.7 wt (129); col.8 line 47-54) for the purpose of reducing the complexity or length of the transfer function. Thus, taking the combined teaching of Feng et al. and Abel as a whole, it would have been obvious for one of the ordinary skill in the art to have modify Feng et al. with frequency response wherein the at least one inverse filter comprises a warped inverse filter for the purpose of reducing the complexity or length of the transfer function.

3. Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feng et al. (US 7,076,072 B2) and further in view of Lavoie et al. (US 7,158,643 B2).

Re claim 8, the Handsfree system according to claim 6, However, Feng et al. fail to disclose of the where each inverse filter comprises

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an approximate inverse of a non-minimum phase filter. But, Lavoie et al. disclose of a system wherein the inverse filter comprises an approximate inverse of a non-minimum phase filter (col.8 line 30-36; col.11 line 30-35) for the purpose of creating a stable filter for infinite response. Thus, taking the combined teaching of Feng et al. and Lavoie et al. as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify Feng et al. with incorporating the inverse filter comprises an approximate inverse of a non-minimum phase filter for the purpose of creating a stable filter for infinite response.

4. Claims 12-14,25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over over Feng et al. (US 7,076,072 B2) and further in view of Brennan et al. (US 2003/0063759).

**Re claim 12**, the Handsfree system according to claim 1 with the array microphone, However, Feng et al. fail to disclose of the where the configuration of the microphone array comprises at least two microphones arranged in an endfire orientation with respect to a first position. But, Brenman et al. disclose of a fixed beamforming system wherein the configuration of the microphone array comprises at least two microphones arranged in an endfire orientation with respect to a position (fig.3; [0006,0009]) for the purpose of providing constant



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directivity regardless of the movement of the source. Thus, taking the combined teaching of Feng et al. and now Brennan et al. as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify Feng et al. with incorporating the the configuration of the microphone array comprises at least two microphones arranged in an endfire orientation with respect to a position for the purpose of providing constant directivity regardless of the movement of the source.

Re claim 13, the Handsfree system according to claim 12, with the two microphone array in endfire orientation to a position, the combined teaching of Feng et al. and Brennan et al. as a whole, would have further incorporate of the microphone array arranged with endfire orientation with respect to a second position (feng; col.10 line 24-30).

Re claim 14, the combined teaching of Feng et al. and now Brennan et al. as a whole, disclose of the Handsfree system according to claim 13, with the at least two microphones in the first endfire orientation and the at least two microphones in the second endfire orientation (see claim 13 explanation), However, the combined teaching of Feng et al. and Brennan et al. as a whole, fail to disclose of the specific wherein the endfire microphone orientations comprise a microphone in common. However, official notice is taken the concept of having a common microphone in each endfire location is commonly known in the

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art, thus official notice is taken it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify the the combined teaching of Feng et al. and Brennan et al. as a whole, by incorporating the specific with the concept of having a common microphone in each endfire location for providing excellent directivity with fewer microphones.

Re claims 25-26 have been analyzed and rejected with respect to claims 12-13.

5. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feng et al. (US 7,076,072 B2) and further in view of Iwahara et al. (US 4,696,043 ).

Re claim 15, the Handsfree system according to claim 1 with the array microphones, However, Feng et al. fail to disclose of the where the microphone array comprises at least two subarrays. However, Iwahara et al. disclose of an array of microphone wherein the microphone array comprises at least two subarrays (fig.1,11; col.2 line 50-65) for the purpose of easily realizing sharpness on the

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microphones. Thus, taking the combined teaching of Feng et al. and Iwahara et al. as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify Feng et al. by incorporating the microphone array comprises at least two subarrays for the purpose of easily realizing sharpness on the microphones.

Re claim 16, the Handsfree system according to claim 16 where at least two subarrays comprise at least one microphone in common (col.2 line 61/all microphone may be omnidirectional).

6. Claims 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feng et al. (US 7,076,072 B2) and further in view of Kanazawa et al. (US 6,339,758 B1).

Re claim 10, the Handsfree system according to claim 1, However, Feng et al. fail to disclose where the beamformer comprises the structure of a generalized sidelobe canceller. But, Kanazawa et al. disclose of a system wherein the beamformer comprises the structure of a generalized sidelobe canceller (fig.2a, col.1 line 15-30) for the purpose of improving processing speed during operation. Thus, taking the combined teaching of Feng et al. and Kanazawa et al. as a whole, it would have been obvious for one of the ordinary skill in the art at the time of the invention to have modify Feng et al. by incorporating the beamformer comprises the structure of a generalized sidelobe

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canceller for the purpose of improving processing speed during operation.

7. Claims 11,24 are rejected under 35 U.S.C. 103(a) as being unpatentable Feng et al. (US 7,076,072 B2).

Re claim 11, the Handsfree system according to claim 1 with the beamformer, However, Feng et al. fail to disclose of the where the beamformer comprises a minimum variance distortionless response (MVDR) beamformer. However, the concept of having a beamformer being the specific type of minimum variance distortionless response (MVDR) beamformer is commonly known in the art, thus official notice is taken it would have been obvious to have modify the teaching of Feng et al. by incorporating the beamformer being the specific type of minimum variance distortionless response (MVDR) beamformer for the purpose of enhancing the sound directivity in the known particular location.

Re claim 24, the handsfree system according to claim 23 with error determining of the microphones array directional sensors phase and position (col.15 line 30-65); However, Feng et al. fail to disclose of the specific wherein the relative error of the microphone array is a sum of mean square error of transfer properties of each microphone in the microphone array and a gaussian error with zero mean of microphone positions. But, official notice is taken the similar concept of

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determining the limitation of deviation of microphones error is commonly known in the art, thus it would have been obvious for one of the ordinary skill in the art to have modify Feng et al. with determining the limitation of deviation of microphones error for providing uniform beamwidth across desired range frquencies.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 2615

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Supervisory Patent Examiner, Art Unit 2615